PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PSIC080WO	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/EP2004/007286	International filing date *(day/month/year)* 03.07.2004	Priority date *(day/month/year)* 11.07.2003
International Patent Classification (IPC) or national classification and IPC C08G18/12, C08G18/73, C08G18/32, C09D11/02		
Applicant SICPA HOLDING S.A. et al		

1. This report is the International preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☐ *sent to the applicant and to the International Bureau)* a total of sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
04.02.2005	13.05.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Scheuer, S Telephone No. +49 89 2399-8321

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/007286

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:

   ☐ international search (under Rules 12.3 and 23.1(b))
   ☐ publication of the international application (under Rule 12.4)
   ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-10 as originally filed

   Claims, Numbers

   1-16 as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

   ☐ the description, pages
   ☐ the claims, Nos.
   ☐ the drawings, sheets/figs
   ☐ the sequence listing *(specify)*:
   ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

   ☐ the description, pages
   ☐ the claims, Nos.
   ☐ the drawings, sheets/figs
   ☐ the sequence listing *(specify)*:
   ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/007286

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-16
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-16
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:
D1: WO-A-01/14442
D2: WO 02/38643 A (SUN CHEMICAL CORP) 16 May 2002 (2002-05-16)
D3: EP-A-1 229 090 (SICPA HOLDING SA) 7 August 2002 (2002-08-07)

D2 discloses a polyurethane resin suitable for formulating flexographic and gravure laminating printing ink and coating compositions. Firsly an isocyanate terminated polyurethane prepolymer is prepared from an aliphatic diisocyanate, a diol component having a Mw below 2000 and a polymeric diol having a Mw below 3000, secondly reacting the prepolymer with a diamine such as ethylene diamine and isophorone diamine (claims 1,10,20,50). The difference between the present claims and D2 lies in the preparation of the isocyanate prepolymer comprising the reaction of aliphatic diisocyanates, one or more polyether polyols (Mw≤1500g/mol) and at least one diamine.

D3 discloses a polyurethane resin comprising the reaction product of a diisocyanate with a mixture of polyether polyols having Mw between 1000 and 10000 to form an isocyanate terminated prepolymer and further reacting that prepolymer with at least one diamine (see claims 1,3,4,15). The difference between the present claims and D3 is that in the first step the prepolymer is prepared from diisocyanates, polyether polyols each having a Mw of not more than 1500 g/mol and at least one diamine.

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1-16, and in particular example 24, discloses a polyurethane resin obtainable by reacting isophorone diisocyanate, polytetramethylene ether glycol of Mw (Molecular weight):1400 to form an isocyanate terminated prepolymer, reacting this prepolymer with isophorone diamine and further with diethanol amine. The polyurethane resin is used for the preparation of white ink lamination compositions.

The subject-matter of claim 1-16 differs from D1 in the step b) wherein specific mixtures of diamines are used to react with the isocyanate prepolymer prepared under step a).

The subject-matter of claim 1-16 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as to provide an alternative resin for a white ink and a white ink with improved bond strength on certain substrates.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

- in claim 13 of D1, steps a) and b) would correspond to step a) of present claim 1, the additional step c) of D1 is only optional. Thus D1 does not tell the skilled man that he should necessarily perform such an additional step at all.
- D1 does not teach the skilled man to use the specific mixtures of diamines of the chain-extension step b) of present claim 1 to prepare a polyurethane resin suitable as a resin for white inks.
- The present invention is concerned with the preparation of specific inks, i.e. white inks, therefore the resin must not cause yellowing of the ink layer.
- In D1 a white ink is prepared form a resin as prepared in example 24, however there is no excess of diisocyanate used, but to the contrary an excess of isocyanate-reactive components and it is senseless to add the diethanol amine.
- It was neither disclosed nor suggested in any of D1 to D3 that by carrying out a chain extension with a specific mixture of diamines as defined in present claim 1 one would obtain a white ink having an improved bond strength on certain substrates.

Claims 13-16 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.